CHASSIS Lubricate for SAFETY every 1,000 MILES LUBRICATION

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*Petroleum Lubricating Greases**

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(*Continued from April issue*)

STABILITY

In discussing stability of greases, it is necessary to consider stability from both a physical and chemical standpoint. From the physical standpoint, the stability of grease toward separation of the mineral oil and soap is of primary importance and, despite the fact some excellent work has already been done on this so-called "bleeding" there is much yet to be learned. Research on greases will find a productive field in this problem, particularly in the field of effects of chemical composition, pressure, and temperature on separation.

The reports of Ahlberg (15) and Gillett (16) on their investigation of greases in the Bearing Engineers Committee, employing the Bearing Engineers Committee Machine, have contributed some outstanding work on stability. This work covers the stability as to oil and soap separation, change in structure and texture, change in consistency, channeling and increases in volume in service.

Kaufman (17) has designed a mechanical means of evaluating ball and roller bearing greases and procedure of test, supported by considerable data, which indicates the trend in evaluation of greases in terms of performance. This investigation has been predicated on the following important criteria:

1. Ease of application.
2. Stability in storage (where bearings are packed in grease).
3. Torque characteristics (running and starting torques at high and low temperatures).
4. Leakage.
5. Adherence of grease to the bearing.
6. Temperature of operation.

Kaufman summarizes his experimental work with the statement that the apparatus measures the important characteristics and gives reproducible results. The data indicate that the tendency of a grease to become softer on working down bears no relationship to leakage tendency. The assumption that milling a grease imparts to it the final worked consistency to be expected after use in anti-friction bearings and therefore gives superior performance to an unmilled grease is not confirmed by the data.

Earlier work by Buckley and Bitner (18) studied the breakdown in grease structure due to working, using the Buckley Grease Consistometer. Farmington and Humphries (19) have presented an excellent work on the effect of pressure on lubricating greases utilizing the press designed by Herschel in 1933. In this procedure, the grease is confined and subjected to pressure and the oil, squeezed out through filter paper, is immediately absorbed. From their data, they have arrived at an empirical formula for loss. It is significant in this work that all the grease samples were first worked in an A. S. T. M. grease worker, but it is to be noted that this made a difference of only approximately 2 per cent in the oil loss, indicating that no fundamental change occurred due to working. It is particularly interesting to note that from two greases made with oils of wide difference in viscosity that the initial loss of oil was much more rapid in the low viscosity oil grease, but the ultimate loss of oil for both greases was essentially the same. The initial and ultimate loss of oil was increased by pressure. The oil loss of sodium soap greases was higher than with calcium soap and aluminum soap greases. The "bleeding" of oil from grease is increased by increasing the mineral oil content, decreasing the viscosity of the oil, by increasing the coarseness of the soap fibres, and increasing pressure and temperature.

While it has been generally recognized that a standardized test for stability would be very desirable, the above work definitely indicates that such a test is possible and further research work should result in developing such a test.

Gruse (12) and associates have stated that chemical stability of grease may be influenced by:

1. The environment of a grease, including both the conditions and the substances with which it comes in contact.
2. The deleterious constituents in its own make up.

They have presented the theory of chemical deterioration due to oxidation, hydrolysis, bleeding, the influence of water and metals.

The work of Evans and Kelman (20), McConville (21), Wright and Lutz (22), Wright and Mills (23) have all been valuable contributions to the study of chemical stability. McConville, Wright and Lutz

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* Courtesy American Society for Testing Materials.

*Delco Shock Absorber Service**

Many car owners are today operating cars on which the shock absorbers are not functioning properly. Few recognize this fact because the poor riding action develops over a long period of time and, as with headlights which gradually lose their brilliance the daily change in efficiency goes unnoticed.

Many drivers seldom give shock absorbers a thought until complete failure occurs. They seem to believe that, since the fluid is sealed into the unit, leakage is impossible. While leakage is not a common occurrence, leaks may develop in the arm and lever type at points where the arm shaft passes through the shock absorber body. Dual packings, of either cork or rubber, are used to prevent leakage around the shaft. However, if the fluid level falls below the top diameter of the shaft, the top portion of the packing may become dry. This will cause shrinkage, resulting in leakage of the fluid. The packing is normally lubricated by the fluid and does not become dry when shock absorbers are kept filled.

Also, in the tubular (direct-acting) airplane type of shock absorber, the piston rod passes through a special composition seal. This seal is likewise lubricated by the fluid. If the fluid becomes low, the seal will not be properly lubricated, the friction of the piston rod soon wears out the seal, and the fluid is pumped or worked out of the unit.

Experience has proved that the shock absorber fluid does escape. This may be due to seepage or leakage, worn packing or seals, slight distortion of operating parts, cracked bodies, or possibly there may be slight evaporation of the fluid. So refilling of shock absorbers should be a periodic service. Car owners seldom ask for this service. Service stations should remind the car owner that such service is necessary if new car shock absorber efficiency is to be expected. However, shock absorber service should not be attempted by service stations unless the proper equipment and a mechanic experienced in this line of work is available. Otherwise, the work should be referred to an authorized Delco Shock Absorber dealer.

Here Is What Happens
When Fluid Is Low and Shock Absorbers Are Inoperative

Poor Riding, due to improper control of car body movement. This results in continuous up and down movement of the car body or short, jerky movement, causing fatigue and discomfort to passengers.

Excessive Tire Wear: Rear wheels bouncing over small bumps spin while in the air, causing the rubber to scuff off when they again contact the ground.

Front Wheel Shimmy and Tramp, which is annoying and dangerous.

Body Sway becomes worse. The car body swings to one side on curves, with the consequent danger of turning over, especially while traveling at high speeds.

Steering Wheel Fight or Whip: Shock absorbers should dampen the jar a front wheel receives upon hitting a sharp bump. Inoperative absorbers do not do this and the jar is transmitted to the steering wheel and the driver's hands. This results in dangerous and tiring driving.

High Speed Vibration is caused by the wheels leaving the ground, which builds up oscillation and results in terrific vibration at high speeds.

Spring Breakage: An additional strain is placed on car springs. They have a free, uncontrolled movement which often results in breakage.

Headlight Glare

Comments have been received with regard to the "flare up" of headlights which occurs upon acceleration of the engine after idling.

Where this condition is noticed it should not be assumed that the battery is in a run-down condition or that there is anything abnormal in the electrical system unless proper tests indicate that such is the case.

Increased light output upon acceleration of the engine is normal. The reason for this is that with the engine idling, the generator is not operating to capacity and the voltage at the headlights is approximately 5.8 volts, while with the engine speeded up to the point where the generator is charging, the battery voltage is raised to the Regulator setting and there is an increase of approximately 1 volt at the headlights. This increase in voltage results in 30% more light output.

While the above condition has existed in the past, it has become more noticeable with the Sealed Beam headlights used on 1940 cars. This is easily understood when one considers that the 32 candle power bulbs previously used drew 4.25 amps. per bulb at from 5.9 to 6.1 volts while the new Sealed Beam units draw approximately 7 amps. per unit at 6.4 volts.

If after taking the above circumstances into consideration the headlight flare still seems abnormal, the battery should be checked for being in a run-down condition and the wiring should be checked for loose, dirty or corroded connections in the headlight circuit.

—Courtesy General Motors Products of Canada, SERVICE NEWS.

*Car Manufacturers' Latest Recommendations**

Columbia Two-Speed Rear Axle—Ford, Mercury and Lincoln Zephyr

The Columbia two-speed (overdrive) rear axle is approved optional equipment on the Lincoln Zephyr and models so equipped may be ordered from the factory. Although Ford and Mercury cars are not available from the factory so equipped, Columbia two-speed rear axles may be installed by Ford dealers on these models, as well as on Lincoln Zephyrs already in the field. In such cases, the dealer assumes the responsibility of guaranteeing satisfactory operation.

Graham Starts New 1940 Line

Production on the early 1940 Graham models has been limited and very few of them have been produced. The factory has been out of production for some time retooling for an entirely new line. These new models started production in April. The 1940 "Special" is now known as the "De Luxe" and the "Supercharger" as the "De Luxe Supercharger." Two new models have been added to the line — the "Hollywood Supercharger" and the "Clipper."

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Petroleum Lubricating Greases

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have shown that although moisture accelerates the rate of oxidation of grease, it does not appear to be a major factor.

Wright and Mills have applied an accelerated oxidation test to classify lubricating greases for chemical stability, applied particulary to greases employed on anti-friction bearings.

Most of the research work on chemical stability has indicated the need for study of inhibiting agents such as anti-oxidants.

EXTREME PRESSURE LUBRICANTS

Any discussion of greases would be incomplete without mention of extreme pressure lubricants and in particular those falling within the definition of petroleum greases, as the lead soap active sulfur type. These lubricants fall in two general classes: i.e., the mild extreme pressure lubricants and the active extreme pressure lubricants. In general their load carrying capacity can be attributed to their ability to maintain a film, due to having better wetting properties, in clearances where a straight mineral oil or grease will not penetrate and, secondly, by bringing about a chemical reaction on the bearing surface itself. While a detailed reference on the subject of extreme pressure lubricants is too lengthy for inclusion herein, the subject is well covered in the Transaction of the Society of Automotive Engineers for the past five years.

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WELCOME

It is a pleasure to announce that Calumet Refining Co., 4323 So. Western Blvd., Chicago, Ill., have become associate members of the Institute and will be represented by Mr. T. A. Telfer, Vice-President.

NOTICE

To those who have not returned "correct address" card enclosed with last issue, kindly do so at once so that our mailing list can be brought up to date.

Car Manufacturers' Latest Recommendations

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OILLESS TYPE DOOR HINGE
1940 Pontiac Models

An oilless type door hinge is now being used on bodies of all 1940 Pontiac models. This new type is easily discernible by either the word "oilless" stamped in the hinge strap across the oil hole or by the omission of the oil hole entirely.

This new type hinge does not require oil by reason of the graphite impregnated bronze bushings which are used in place of the solid brass bushings that were formerly used. These bushings are used in both the strap type exposed door hinges and in the box type concealed door hinges.

OLDSMOBILE HYDRA-MATIC DRIVE FLUID
Also Recommended for Automatic Safety Transmissions

Automatic Safety Transmissions were installed on Oldsmobile 1937, '38, and '39 models as optional equipment. The 1940 models are available with the new Oldsmobile Hydra-Matic Drive Transmission, for which a lubricant known as "Hydra-Matic Drive Fluid" is recommended. The Oldsmobile factory now announces that this new fluid is also recommended for use in Automatic Safety Transmissions on the 1937, '38 and '39 models.

Hydra-Matic Drive Fluid *must* be used in the 1940 Hydra-Matic Drive Transmission if warranty is to remain in force. The use of this new fluid in Automatic Safety Transmissions on 1937, '38 and '39 models is *not* compulsory. The present recommendations of the proper grades of Motor Oil remain unchanged. Since the new fluid is specially treated to prevent gumming and varnish formation within the unit, it is stated that the new fluid will likely prove more satisfactory for year 'round use in the Automatic Safety Transmission units.

SPRING SERVICING OF COOLING SYSTEMS

It is just as important that cooling systems on automotive units be properly serviced for Summer driving as for Winter operation. In fact, rust accumulation is more pronounced in Summer than in Winter. Proper Spring servicing of cooling systems requires much more than merely the draining of the anti-freeze solution and filling with fresh, pure water.

Very few car owners would risk a Winter's driving without anti-freeze protection in the cooling system of their cars. When Winter is over, however, too many apparently forget about the cooling system except for adding water from time to time, but laboratory tests show that full strength corrosion protection of the cooling system is needed more in Summer than in Winter because of the rapid formation of rust.

SUMMER RUST

Most anti-freeze solutions contain a rust preventive and it is, therefore, important that when the Winter solution is drained and the cooling system refilled for Summer driving, a rust preventive be added to the water. But even the car owner who takes pride in the efficient operation of his car, very often neglects to protect it against rusting in Summer when this protection is most needed.

One explanation of Summer rust is aeration. The thermostat, which controls cooling system temperature by regulating the water flow through the radiator, may cut down the flow to a few gallons per minute in Winter. Reducing the water flow in cold weather keeps the engine from running too cool. On the other hand, in warm weather, full flow of the water — as much as fifty gallons per minute — may be rushing through the radiator. In warm weather full flow of the water keeps the engine from running hot. This rapid flow causes turbulence in the top tank of the radiator and entrains large quantities of air in the water. Under high speed, warm weather driving, the amount of air entrained in the water may be as much as 1½% of the capacity of the cooling system. Mixing air with water has been found by test to increase rusting as much as thirty times.

Summer rust can cause very serious overheating trouble from clogging of the radiator and water jacket passages, from corrosion of the water distribution tube, side plate, upper radiator tank, radiator core, or water pump impeller. Cracking of the cylinder head and engine block, burnt valves, stuck piston rings and scored pistons are some of the evils resulting from overheating.

It is, therefore, very important to prevent Summer rust — *and it can be done.* "Rust-Proofing" of cooling systems is recommended by leading car and truck manufacturers. The wide awake dealer, knowing the harmful results of cooling system neglect, is given a splendid opportunity to promote and sell Summer rust protection. This protection can be provided by using a suitable rust inhibitor which effectively protects all the metals of the cooling system from rust and corrosion damage. Summer rust prevention is easy to sell and takes only a minute to install.

Petroleum Lubricating Greases

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